LESSON MAKER PRO

Find the Breakpoint

Use linear equations and inequalities to make predictions.

GRADE 8 · 8A.AF.E

8A.AF.E "Expressions, equations, and inequalities can be used to analyze and make predictions, both within mathematics and as mathematics is applied in different contexts – in particular, contexts that arise in relation to linear, quadratic..."

NAME _____ DATE _____

MODEL AND SOLVE

A linear model can show a starting amount and the same change for each unit of x. Use an equation to find when an amount reaches a target, or an inequality to find when it meets a limit. If you divide an inequality by a negative number, reverse the inequality sign.

WORKED EXAMPLE

Solve $11x + 17 = 83$.

1. Subtract 17 from both sides: $11x = 66$.
2. Divide both sides by 11: $x = 6$.

Answer: x = 6

PRACTICE 6 problems

1 Solve $3x + 8 = 32$.

ANSWER _____

2 Solve $12 + 2x = 38$. Check your answer by substitution.

ANSWER _____

3 Solve $10x - 14 = 26$.

ANSWER _____

4 Solve $24 - 3x = 0$.

ANSWER _____

5 Solve $2x + 15 \leq 33$.

ANSWER _____

6 Solve $40 - 4x < 12$.

ANSWER _____

APPLY IT Show your work

1 You pay a one-time $12 signup fee plus $3 per month for a music app. You have $42. What is the greatest number of whole months you can pay for?

WORK SPACE

ANSWER _____

2 Your phone has 80% battery. Watching videos uses 8 percentage points of battery per hour. After how many hours will the battery reach 24%?

WORK SPACE

ANSWER _____

CHALLENGE One step up

At an arcade, Pass A costs $16 plus $2 per game. Pass B costs $4 plus $5 per game. For how many games do the passes cost the same? For which whole numbers of games is Pass A cheaper? Show how you know.

WORK SPACE AND ANSWER

ANSWER KEY

Find the Breakpoint

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve 3x + 8 = 32.	**x = 8**
2	Solve 12 + 2x = 38. Check your answer by substitution.	**x = 13; 12 + 2(13) = 38.**
3	Solve 10x - 14 = 26.	**x = 4**
4	Solve 24 - 3x = 0.	**x = 8**
5	Solve 2x + 15 ≤ 33.	**x ≤ 9**
6	Solve 40 - 4x < 12.	**x > 7**

PART 2 · APPLY IT

1. **10 months** Solve 12 + 3x ≤ 42 to get x ≤ 10. The greatest whole-number value is 10.
2. **7 hours** Solve 80 - 8x = 24 to get x = 7.

CHALLENGE

The passes cost the same for 4 games because 16 + 2(4) = 4 + 5(4) = 24. Pass A is cheaper for 5 or more games because 16 + 2x < 4 + 5x when x > 4.

Accept equivalent inequality notation. In the challenge, accept an equation and a correctly solved inequality, or another clear comparison that supports both conclusions.